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IS 5560 (1970): Compounded Feeds for Young Stock [FAD 5: Livestock Feeds, Equipment and Systems]



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IS : 5560 - 1970
(Reaffirmed 1980)

(Reaffirmed 2004)

Indian Standard

SPECIFICATION FOR COMPOUNDED FEEDS FOR YOUNG STOCK

(First Reprint JULY 1983)

UDC 636.085.55 : 636.2



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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR COMPOUNDED FEEDS FOR YOUNG STOCK

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Indian Standard

SPECIFICATION FOR COMPOUNDED FEEDS FOR YOUNG STOCK

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 January 1970, after the draft finalized by the Animal Feeds Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Proper nourishment of calves is of extreme importance to ensure better performance in their later life. Therefore, for providing optimum nutrition it is essential that feeds supply sufficient energy and contain a proper balance of proteins, minerals and vitamins. Such feeds should be low in fibre and highly digestible. In order to make available feeds of a proper quality for feeding the young stock this standard is being prepared. It is expected that this standard when published would assist in formulation of feeds meant for young stock feeding and also help in exercising proper quality control during production.

0.3 This standard takes into consideration feeds meant for feeding calves ranging in their age from approximately 8 weeks to 108 weeks. In view of the specialized nature of feeds required to be given to calves from birth to approximately 8 weeks age, such feeds have not been covered in this specification.

0.4 Besides the requirements (*see 4*), it is imperative for the manufacturers to comply with the following requirements and declare them after periodical testing:

<i>Characteristic</i>	<i>Requirements</i>	
	Calf Starter Meal	Calf Growth Meal
Common salt (on dry basis), percent by weight, <i>Max</i>	1.0	1.5
Calcium (as Ca) (on dry basis), percent by weight, <i>Min</i>	1.2	1.2
Phosphorus (as P) (on dry basis), percent by weight, <i>Min</i>	0.8	0.8
Vitamin A, IU kg	10 000	5 000
Total digestible nutrients (on dry basis), percent by weight, <i>Min</i>	70	65
Digestible crude protein (on dry basis), percent by weight, <i>Min</i>	17	16.5

0.4.1 Tests for the determination of the characteristics mentioned in **0.4** shall be as given in Appendices G to K of IS : 2052-1968*.

0.5 For the guidance of those interested in compounding feeds for young stock, a few feed formulae, which have been used in the research organizations and which have given satisfactory results, have been included in this standard (*see* Appendix A). However, if necessary, suitable modifications may be made in the feed formulae according to locality, season and availability of the ingredients.

0.6 For convenience a list of referred standards is included in Appendix B.

0.7 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for compounded feeds for young stock.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Calf Starter Meal — A meal for calves to be made available from the age of approximately 8 weeks and to be fed up to approximately 26 weeks.

2.2 Calf Growth Meal — A meal for calves to be introduced gradually into the diet from the age of approximately 26 weeks and to be fed up to approximately 108 weeks.

3. TYPES

3.1 Compounded feeds for young stock shall be of two types as follows:

- a) Calf Starter Meal (CSM), and
- b) Calf Growth Meal (CGM).

4. REQUIREMENTS

4.1 Description — Compounded feeds for young stock shall be in the form of a meal or pellets. The feeds shall be free from harmful constituents,

*For the title of the standard, *see* Appendix B.

such as dust and metallic pieces; adulterants; insect or fungus infestation; and from musty, rancid or any other objectionable odour.

4.2 Ingredients — In compounding feeds of the two types for young stock, only the ingredients listed in Appendix C shall be used.

4.3 In addition to the requirements specified in 4.1 and 4.2, the feeds of the two types shall also conform to the requirements specified in Tables 1 and 2.

TABLE 1 REQUIREMENTS FOR CALF STARTER MEAL

Sl. No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO APPENDIX IN	
			This Standard	IS : 2052-1968*
(1)	(2)	(3)	(4)	(5)
i) Moisture, percent by weight, <i>Max</i>		10	—	B
ii) †Crude protein ($N \times 6.25$), percent by weight		23-26	—	C
iii) Crude fat, percent by weight, <i>Min</i>		4	D	—
iv) Crude fibre, percent by weight, <i>Max</i>		7	—	D
v) Total ash, percent by weight, <i>Max</i>		5.0	E	—
vi) Acid insoluble ash, percent by weight, <i>Max</i>		2.5	—	E

NOTE — The values for requirements (ii) to (vi) are on moisture-free basis.

*For the title of the standard, see Appendix B.

†While analyzing for crude protein it should be ensured that the nitrogen has not been derived from urea or other ammonium salts.

TABLE 2 REQUIREMENTS FOR CALF GROWTH MEAL

Sl. No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO APPENDIX IN	
			This Standard	IS : 2052-1968*
(1)	(2)	(3)	(4)	(5)
i) Moisture, percent by weight, <i>Max</i>		10	—	B
ii) †Crude protein ($N \times 6.25$), percent by weight		22-25	—	C
iii) Crude fibre, percent by weight, <i>Max</i>		10	—	D
iv) Total ash, percent by weight, <i>Max</i>		5.0	E	—
v) Acid insoluble ash, percent by weight, <i>Max</i>		3.5	—	E

NOTE — The values for requirements (ii) to (v) are on moisture-free basis.

*For the title of the standard, see Appendix B.

†While analyzing for crude protein it should be ensured that the nitrogen has not been derived from urea or other ammonium salts.

4.4 In the case of Calf Starter Meals (CSM), antibiotics shall be added according to the manufacturer's recommendations.

5. PACKING AND MARKING

5.1 Packing — Compounded feeds for young stock shall be packed in clean and sound plain or polyethylene lined jute or laminated paper bags. The mouth of each bag shall be either machine-stitched or rolled over and hand-stitched.

5.2 Marking — Each bag shall be marked or labelled to give the following information:

- a) Name of the material,
- b) Name of the manufacturer,
- c) List of ingredients,
- d) Net weight in kg, and
- e) Batch or code number.

5.2.1 Each bag may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

6. SAMPLING

6.1 The method of drawing representative samples of the material and the criteria for conformity shall be according to the method prescribed in Appendix F of IS : 2052-1968*.

7. TESTS

7.1 Tests shall be carried out as prescribed in the relevant appendices specified in col 4 and 5 of Tables 1 and 2.

7.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1960*) shall be employed in the tests.

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the experimental results.

*For the title of the standard, *see* Appendix B.

APPENDIX A

(Clause 0.5)

RECOMMENDED FEED FORMULAE

A-1. A few typical feed mixtures that have been tried out and have given satisfactory results are given below:

Calf Starter Meal

1. Barley	40	9. Groundnut oilcake	30
Gram	10	Maize (crushed)	30
Groundnut oilcake	30	Wheat bran	20
Wheat bran	20	Gram (crushed)	20
2. Barley	50	10. Maize, <i>JOWAR</i> or gram	25.0
Groundnut oilcake	40	Oats or barley	37.5
Wheat bran	10	Wheat bran	12.5
3. Barley	70	Linseed oilcake (solvent	12.5
Groundnut oilcake	20	extracted)	
Wheat bran	10	Blood meal	12.5
4. Barley	80	11. Barley, oats, maize or	70
Groundnut oilcake	20	broken rice (crushed)	
5. Barley	65	Groundnut oilcake	20
Groundnut oilcake	25	Wheat bran	10
Molasses	10	12. Oats	14
6. Barley	40	Barley	35
Gram	20	Maize	21
Groundnut oilcake	20	Groundnut oilcake	20
Wheat bran	20	Wheat bran	10
7. Maize	5	13. Barley, oats or maize	65
Groundnut oilcake	25	(crushed)	
Wheat bran	10	Groundnut oilcake	25
Gram	10	Molasses	10
Lucerne meal	50	14. Rice (broken)	65
8. Maize barley,	50	Groundnut oilcake	15
oats or ragi		Molasses	10
Groundnut oilcake	10	Fish meal	10
Linseed oilcake or	10	15. Barley	70
solvent extracted		Groundnut oilcake	20
linseed oilcake		Wheat bran	10
Fish meal, meat meal	10		
or milk powder			
Wheat bran	20		

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16. Barley or maize	30	22. Oats (crushed and sieved)	37
Bengal gram or horse gram	10	Groundnut oilcake	40
Groundnut oilcake	30	Wheat bran	10
Wheat bran	30	Molasses	10
17. Barley (crushed)	47	Common salt	2
Groundnut oilcake	40	Mineral mixture	1
Wheat bran	10	23. Maize (crushed)	20
Common salt	2	Gram (crushed)	20
Mineral mixture	1	Wheat bran	7
18. Maize (crushed)	30	Groundnut oilcake	30
Gram (crushed)	20	Lucerne meal	10
Groundnut oilcake	30	Molasses	10
Wheat bran	17	Common salt	2
Common salt	2	Mineral mixture	1
Mineral mixture	1	24. Barley (crushed)	17
19. Maize (crushed)	30	Gram (crushed)	17
Gram (crushed)	27	Groundnut oilcake	35
Soyabean oilcake	40	Wheat bran	8
Common salt	2	Berseem meal	10
Mineral mixture	1	Molasses	10
20. Barley (crushed)	22	Common salt	2
Gram (crushed)	15	Mineral mixture	1
Linseed oilcake	60	25. Maize (crushed)	45
Common salt	2	Wheat bran	17
Mineral mixture	1	Groundnut oilcake	27
21. Rice (broken)	20	Fish meal (60% protein)	8
Rape oilcake	45	Common salt	2
Rice bran	20	Mineral mixture	1
ARHAR CHUNI	12	26. Oats (crushed and sieved)	50
Common salt	2	Groundnut oilcake	40
Mineral mixture	1	Molasses	7
		Common salt	2
		Mineral mixture	1

CALF GROWTH MEAL

1. Maize (crushed)	22	2. Maize (crushed)	20
Groundnut oilcake	30	Groundnut oilcake	33
Wheat bran	25	Wheat bran	24
Lucerne meal	20	Berseem meal	20
Common salt	2	Common salt	2
Mineral mixture	1	Mineral mixture	1

3. Tapioca flour	20	7. <i>JOWAR</i>	37
Groundnut oilcake	30	Wheat bran	30
Wheat bran	37	Groundnut oilcake	30
Molasses	10	Common salt	2
Common salt	2	Mineral mixture	1
Mineral mixture	1		
4. Rice (broken)	15	8. Oats (crushed)	30
Horse gram	20	Groundnut oilcake	30
Mustard oilcake	40	Gram <i>CHUNI</i>	30
Rice bran	22	Gram husk	7
Common salt	2	Common salt	2
Mineral mixture	1	Mineral mixture	1
5. Gram	25		
Oats (crushed)	25	9. <i>ARHAR CHUNI</i>	30
Groundnut oilcake	27	Gram husk	10
Wheat bran	20	Wheat bran	32
Common salt	2	Groundnut oilcake	15
Mineral mixture	1	Fish meal (60% protein)	10
6. Barley (crushed)	37	Common salt	2
Gram <i>CHUNI</i>	10	Mineral mixture	1
Linseed oilcake	50		
Common salt	2		
Mineral mixture	1		

APPENDIX B

(*Clause 0.6*)

LIST OF REFERRED INDIAN STANDARDS

IS : 2-1960	Rules for rounding off numerical values (<i>revised</i>)
IS : 1070-1960	Specification for water, distilled quality (<i>revised</i>)
IS : 1509-1959	Specification for tapioca chips for animal feed
IS : 1510-1959	Specification for tapioca flour for animal feed
IS : 1664-1968	Specification for mineral mixtures for supplementing cattle feeds (<i>first revision</i>)

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IS : 1712-1960	Specification for cottonseed oilcake as livestock feed
IS : 1713-1960	Specification for decorticated groundnut oilcake as livestock feed
IS : 1932-1961	Specification for mustard and rape oilcake as livestock feed
IS : 1934-1961	Specification for sesamum (<i>TIL</i>) oilcake as livestock feed
IS : 1935-1961	Specification for linseed oilcake as livestock feed
IS : 2052-1968	Specification for compounded feeds for cattle (<i>first revision</i>)
IS : 2151-1962	Specification for maize germ oilcake
IS : 2153-1962	Specification for maize bran
IS : 2154-1962	Specification for coconut oilcake as livestock feed
IS : 2239-1962	Specification for wheat bran
IS : 3160-1965	Specification for <i>TUR CHUNI</i>
IS : 3161-1965	Specification for gram <i>CHUNI</i>
IS : 3162-1965	Specification for gram husk
IS : 3165-1965	Specification for rice polish
IS : 3440-1966	Specification for solvent extracted linseed oilcake (meal) as livestock feed
IS : 3441-1966	Specification for solvent extracted groundnut oilcake (meal) as livestock feed
IS : 3591-1968	Specification for solvent extracted coconut oilcake (meal) as livestock feed (<i>first revision</i>)
IS : 3592-1968	Specification for solvent extracted cottonseed oilcake (meal) as livestock feed. (<i>first revision</i>)
IS : 3593-1968	Specification for solvent extracted rice bran as livestock feed (<i>first revision</i>)
IS : 3648-1966	Specification for rice bran

APPENDIX C

(Clause 4.2)

INGREDIENTS FOR COMPOUNDING FEEDS FOR
YOUNG STOCK

C-1. CALF STARTER MEALS

C-1.1 Besides common salt, Vitamin A and mineral mixture, only the following ingredients shall be used for compounding feeds for calf starters:

Grains and SeedsBarley (*Hordeum vulgare*)Gram (*Cicer arietinum* L.)JOWAR, CHOLAM (*Sorghum vulgare*)Maize (*Zea mays*)Oats (*Avena sterilis*)

Peas

Ragi (*Eleusine coracena* Gaertn.)**Grain By-Products**ARHAR or TUR (*Cajanus cajan* L.) CHUNI (see IS : 3160-1965*)

Gram CHUNI (see IS : 3161-1965*)

MQTH (*Phaseolus aconitifolius* Jacq.) CHUNIMUNG (*Phaseolus aureus* Roxb.) CHUNIURD (*Phaseolus mungo* L.) CHUNI

Wheat bran (see IS : 2239-1962*)

Oilcakes and Meals

Coconut oilcake (see IS : 2154-1962*) and solvent extracted coconut oilcake (meal) (see IS : 3591-1968*)

Cottonseed oilcake (see IS : 1712-1960*) and solvent extracted cottonseed oilcake (meal) (see IS : 3592-1968*)

Groundnut oilcake (see IS : 1713-1960*) and solvent extracted groundnut oilcake (meal) (see IS : 3441-1966*)

Linseed oilcake (see IS : 1935-1961*) and solvent extracted linseed oilcake (meal) (see IS : 3440-1966*)

Maize germ oilcake (see IS : 2151-1962*)

*For the title of the standard, see Appendix B.

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Sesamum (*TIL*) oilcake (*see* IS : 1934-1961*) and solvent extracted
sesamum (*TIL*) oilcake (meal)

Soyabean (*Glycine max*) oilcake and solvent extracted soyabean oilcake
(meal)

Tubers and Roots

Tapioca chips (*see* IS : 1509-1959*) and tapioca flour (*see* IS : 1510-1959*)

Animal Products

Bloodmeal

Fishmeal

Meatmeal

Silkworm pupae (dried and freed from membraneous covering)

Skimmed milk powder

Greens

Berseem (*Trifolium alexandrium*) meal

Lucerne (*Medicago sativa*) meal

Waste Materials and Industrial By-Products

Brewer's yeast

Molasses

C-2. CALF GROWTH MEALS

C-2.1 Besides common salt, Vitamin A and mineral mixture, only the following ingredients shall be used for compounding feeds for growing calves:

Grains and Seeds

Barley (*Hordeum vulgare*)

Gram (*Cicer arietinum* L.)

JOWAR, CHOLAM (*Sorghum vulgare*)

Maize (*Zea mays*)

Oats (*Avena sterilis*)

Peas

Ragi (*Eleusine coracena* Gaertn.)

Grain By-Products

ARHAR or TUR (*Cajanus cajan* L.) CHUNI (*see* IS : 3160-1965*)

*For the title of the standard, *see* Appendix B.

Gram *CHUNI* (*see* IS : 3161-1965*)

Gram husk (*see* IS : 3162-1965*)

Maize bran (*see* IS : 2153-1962*)

MOTH (*Phaseolus aconitifolius* Jacq.) *CHUNI*

MUNG (*Phaseolus aureus* Roxb.) *CHUNI*

Rice bran (*see* IS : 3648-1966*), rice polish (*see* IS : 3163-1965*) and solvent extracted rice bran (*see* IS : 3593-1968*)

URD (*Phaseolus mungo* L.) *CHUNI*

Wheat bran (*see* IS : 2239-1962*)

Oilcakes and Meals

Coconut oilcake (*see* IS : 2154-1962*) and solvent extracted coconut oilcake (meal) (*see* IS : 3591-1968*)

Cottonseed oilcake (*see* IS : 1712-1960*) and solvent extracted cottonseed oilcake (meal) (*see* IS : 3592-1968*)

Groundnut oilcake (*see* IS : 1713-1960*) and solvent extracted groundnut oilcake (meal) (*see* IS : 3441-1966*)

Linseed oilcake (*see* IS : 1935-1961*) and solvent extracted linseed oilcake (meal) (*see* IS : 3440-1966*)

Maize germ oilcake (*see* IS : 2151-1962*)

Mustard and rape oilcake (*see* IS : 1932-1961*) and solvent extracted mustard and rape oilcake (meal)

Sesamum (*TIL*) oilcake (*see* IS : 1934-1961*) and solvent extracted sesamum (*TIL*) oilcake (meal)

Soyabean (*Glycine max*) oilcake and solvent extracted soyabean oilcake (meal)

Tubers and Roots

Tapioca chips (*see* IS : 1509-1959*) and tapioca flour (*see* IS : 1510-1959*)

Animal Products

Bloodmeal

Fishmeal

Meatmeal

Silkworm pupae (dried and freed from membraneous covering)

Skimmed milk powder

Greens

Berseem (*Trifolium alexandrium*) meal

Lucerne (*Medicago sativa*) meal

*For the title of the standard, *see* Appendix B.

Waste Materials and Industrial By-Products

Brewer's yeast

Mango seed kernels (dried)

Molasses

A P P E N D I X D

[Table 1, item (iii)]

DETERMINATION OF CRUDE FAT OR ETHER EXTRACT

D-1. REAGENT

D-1.1 Petroleum Ether — of boiling point 40° to 60°C.

D-2. PROCEDURE

D-2.1 Weigh accurately about 5 g of the prepared dried sample and extract with petroleum ether for 8 hours in a Soxhlet or other suitable extractor. Dry the extract on a steam-bath for 30 minutes, cool in a desiccator and weigh. Continue, at 30-minute intervals, this alternate drying and weighing until the difference in weight between two successive weighings is less than one milligram. Note the lowest weight.

NOTE — If necessary, preserve the fat-free material in a desiccator for the determination of crude fibre.

D-3. CALCULATION

D-3.1 Crude fat or ether extract (on moisture-free basis), percent by weight
$$= \frac{100 (W_1 - W_2)}{W}$$

where

W_1 = weight in g of the extraction flask with the dried ether extract,

W_2 = weight in g of the extraction flask, and

W = initial weight in g of the dried material taken for the test.

APPENDIX E

[Table 1, Item (v), and Table 2, Item (iv)]

DETERMINATION OF TOTAL ASH

E-1. PROCEDURE

E-1.1 Weigh accurately about 2 g of the dried material (*see* **D-2.1** of IS : 2052-1968*) in a tared porcelain, silica or platinum dish. Ignite with the flame of a Meker burner for about one hour. Complete the ignition by keeping in a muffle furnace at $600^{\circ} \pm 20^{\circ}\text{C}$ until grey ash results. Cool in a desiccator and weigh. Ignite the dish again in the muffle furnace for 30 minutes, cool and weigh. Repeat this process until the difference in weight between two successive weighings is less than 1 mg. Note the lowest weight.

NOTE — Preserve the dish containing this ash for the determination of acid insoluble ash.

E-2. CALCULATION

E-2.1 Total ash (on moisture-free basis),
percent by weight
$$= \frac{100 (W_2 - W)}{W_1 - W}$$

where

W_2 = the lowest weight in g of the dish with the ash,

W = weight in g of the empty dish, and

W_1 = weight in g of the dish with the dried material taken for the test.

*For the title of the standard, *see* Appendix B.